

A RUST ON WOODWARDIA FIMBRIATA

J. H. FAULL

THREE RUSTS have been described on chain ferns; a fourth is recorded as having a chain fern added to its list of hosts. They are: *Uredinopsis Arthuri* Faull II¹, II², III on *Woodwardia virginica* (L.) Sm.; *U. Arthuri* var. *maculata* Faull II¹, II², III on *W. areolata* (L.) Moore; *Milesia Tobinagai* (Hirat.) Faull II on *W. japonica* Sm. (described as *Milesina Tobinagai* by Hiratsuka in Journ. Jap. Bot. 12: 271, 1936); and *Hyalopsora Polypodii* (Pers.) Magnus on *W. orientalis* Sw. *Uredinopsis Arthuri* is reported from the eastern part of North America and not elsewhere; it is recorded from Alabama to Quebec and from Bermuda to Indiana and Michigan. *Uredinopsis Arthuri* var. *maculata* is likewise known to occur in the eastern part of North America only, but in a much narrower range; it is recorded from Alabama to Maine. *Milesia Tobinagai* is from Japan; it was recorded and described from material collected on the island of Kiushû. *Hyalopsora Polypodii* on *W. orientalis* is reported from Japan; it, too, was recorded from the island of Kiushû. Besides these four there is also an unreported species; that one is on *W. fimbriata* Sm. in California. It is recorded and described below.

Before doing so, however, I should say that I have been reluctant to describe it as a new species. That is so because the urediospores (the only spores so far observed) are like those of *Milesia polypodophila* (Bell) Faull as to size, form, and the not uncommon habit of branching at or near their apices. Of course this rust may be *M. polypodophila*; but many facts have yet to be determined before the answer can be given. Thus: *M. polypodophila* has been reported from eastern North America only; as for its fern hosts there it has been reported only on *Polypodium virginianum*; its alternate host is a conifer, but the loose-broom effect on it is unique; besides that, spermogonia and peridermia are not produced until three years after its infection; it is the only known *Milesia* characterized by such a phenomenon; moreover, its spermogonia are distinctive as to size, length of period of development, abundance of spermatia and length of period of spermatial discharge. So, I have deemed it best to regard this rust on *W. fimbriata* a distinct species pending determination of all its essential features.

***Milesia acuta* Faull, sp. nov., II.**

Spermogonia et aecia ignota. Uredia hypophylla, epidermide tecta, pustulata, rotundata, 0.15–0.5 mm. diam., peridio ex cellulis hyalinis composito cincta; urediosporae fusiformi-obovatae vel fusiformes, acutae

vel acuminatae, subsessiles, hyalinae, $12-19 \times 32-62 \mu$, plus minusve circa $16 \times 51 \mu$; paries sporae hyalinus, levis, tenuis. Telia ignota.

Hab. in foliis *Woodwardiae fimbriatae* in California.

O and I. Spermogonia and aecia unknown.

II. Uredia hypophyllous, subepidermal, on discolored areas of indefinite extent, pustular, round, 0.15–0.5 mm. in diameter; peridium hemispheric, peridial cells isodiametrically to irregularly polygonal, $5-11 \times 5-14 \mu$, with walls about 1μ thick; urediospores hyaline, abundant, extruded in tendrils or masses, very short-stalked, fusiform-obovate or fusiform, acute or acuminate at the apex, occasionally forked or branched at or near the apex, narrowed below, $12-19 \times 32-62 \mu$, averaging about $16 \times 51 \mu$, wall of spore thin, about 1μ thick, smooth, with 4 to 6 germ pores in pairs towards poles or at equator.

III. Telia unknown.

HOSTS AND DISTRIBUTION:

O and I. Unknown.

II. *Woodwardia fimbriata* Sm., in California.

III. Unknown.

TYPE LOCALITY: Mt. Tamalpais, Marin County, California. II.

ILLUSTRATIONS: Text-figure 1.

SPECIMENS EXAMINED. —

CALIFORNIA: Mt. Tamalpais, Marin Co., March 31, 1926, *H. E. Parks*; TYPE. — Mt. Tamalpais, May 30, 1935, *L. Bonar*. — Big Sur, Monterey Co., August 14, 1937, *L. Bonar*. — Darlingtonia, Del Norte Co., Feb. 22, 1942. *H. E. Parks*.

The materials studied were all sent by Professor Lee Bonar; too, the specimens of the last lot were sent at the request of Mr. H. E. Parks. Included with this last lot were three microscopic slides of microtome sections made from a part of the collection. They show that the stoma of a uredium is directly under a leaf stoma; also that the opening is encircled by sharp-pointed peridial cells.

On some of the packets there is written "*Hyalopsora Woodwardiae* Jackson, n. sp." This is a *nomen nudum et ineditum*.

Examination of an abundance of urediospores from the type of *Milesia Tobinagai* shows that they are stout and that they are rounded at their apices. They measure $12-19 \times 19-35 \mu$, and they average about $17 \times 25 \mu$. A good description is given by Hiratsuka in his "A Monograph of the Pucciniastreae", p. 157–8, 1936. There is no likelihood of confusion between *M. Tobinagai* and *M. acuta*.

Woodwardia fimbriata, the one recognized host of *Milesia acuta*, extends northward from California into British Columbia. It has passed under the names *W. radicans*, *W. spinulosa* and *W. Chamissoi*. What the coniferous generic host is and what the comparative effects on its species are, remain for experimentation.

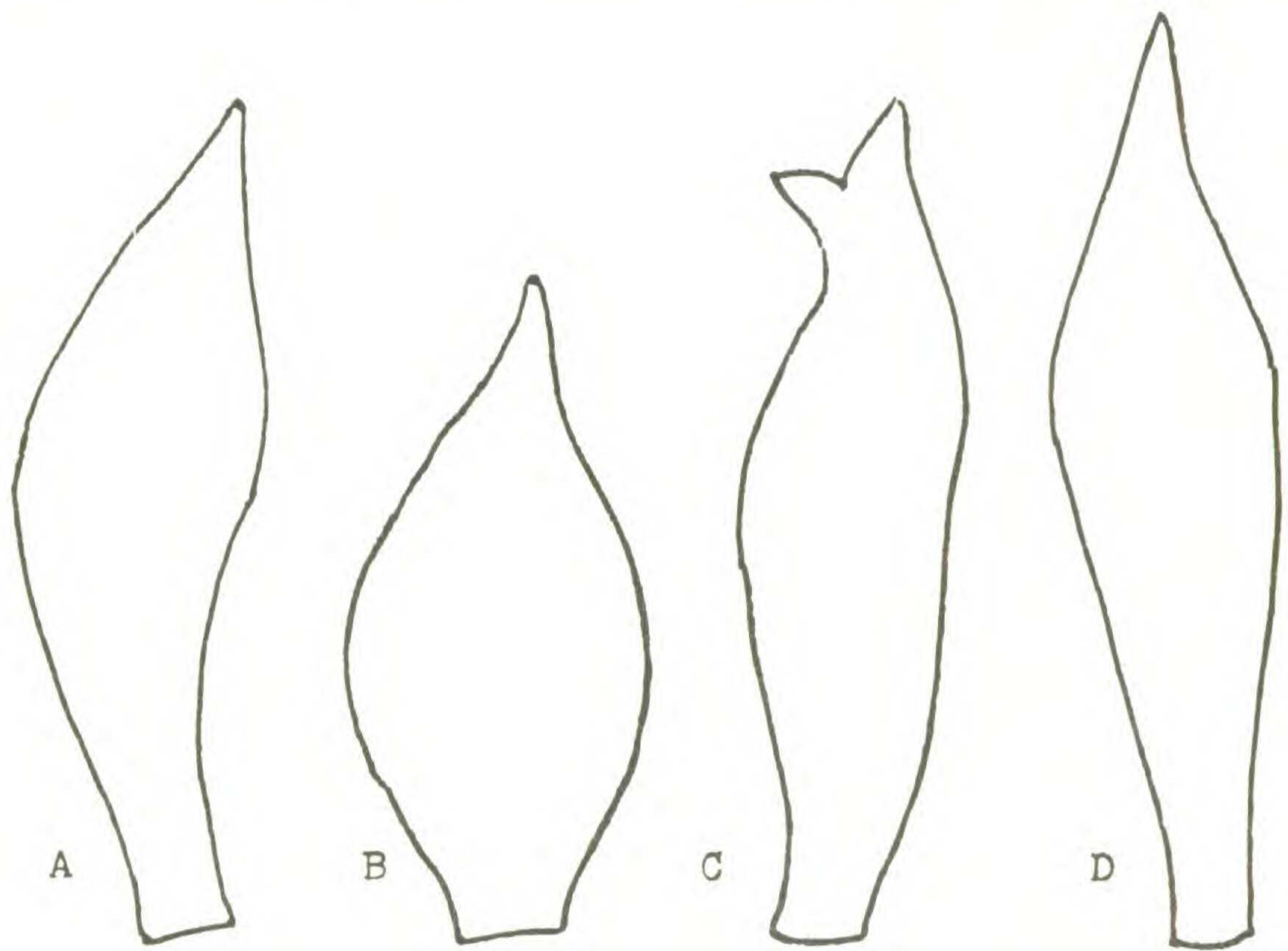


FIG. 1. *Miliesia acuta*, sp. nov. Outlines of four urediospores from same microscopic mount. The one at the extreme left is about average size — $16 \times 51 \mu$.